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AUTHOR Woloshin, Phyllis Lerman
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ABSTRACT

An experiment using game-theory to teach a unit on "fallacies" in logic was conducted at Oakton Community College. One experimental and two control group lecture-style classes were taught by three teachers using the same text and final test. The experimental class, after an introductory segment presented in lecture style, were involved in a courtroom trial situation. Students were randomly divided into three groups of ten, each of which was a litigant fighting over one piece of property. Each student had to develop an individual fallacious argument which was then used to construct the group argument. Selected lawyers from each group presented the arguments at the trial, and students had to signal their lawyers to object each time they recognized a fallacy. Points were awarded to the team for each fallacy sustained, with points deducted for incorrect indentifications. At the conclusion of the three-week unit, the three classes were tested on subject content. The control classes averaged 4.4 and 4.3 from a possible 15 point score, while the experimental group averaged 9.4. Limitations to the study included the lack of a comparative pre-test, variations in teaching styles in the control groups, and variations in student populations. This document also contains a related review of learning theory. The problems and tests used in the experiment are appended. (RT)

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A GAME PLAN FOR TEACHING LOGIC

By

Phyllis Lerman Woloshin, M.A.

Oakton Community College

A practicum presented to Nova University in
Partial fulfillment of the requirements
for the degree of Doctor of Education
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TABLE OF CONTENTS

Chapter		Page
1.	INTRODUCTION	1
	The Nature of the Problem	1
	Purpose of the Investigation	3
2.	BACKGROUND AND SIGNIFICANCE	6
	Institutional Perspective	7
	Nature of the Learner	16
	The Nature of the Teacher	27
	Particular Problems in Teaching Logic	30
	Teaching Strategy	32
	The Goal of Education	35
	Evaluating Performance	38
3.	PROCEDURES	40
	From Instructor Centered to Student Centered	40
	The Trial	43
	Setting up Experiment and Control	45
	Limitations and Assumptions	47
4.	RESULTS	50
5.	DISCUSSION, IMPLICATIONS AND RECOMMENDATIONS	56
BIBLIOGRAPHY		62
APPENDIXES		66

LIST OF APPENDIXES

Appendix		Page
A.	Pre-Test.....	66
B.	Trial - American Dream?.....	68
C.	Memo.....	73
D.	Student Evaluation Sheet.....	75
E.	Test.....	77

INTRODUCTION

The Nature of the Problem

In teaching Logic it had become traditional practise to present material concerning the Informal Fallacies in much the same way as mathematics was taught. That is, the familiar lecture-notes-exercises-test format was employed. It became apparent that the classroom exercises were becoming more and more isolated from the purposes for learning Logic in the first place.

The purpose of teaching Logic in the traditional curriculum was to make the student aware of the common errors in reasoning. The students should then be able to recognize those errors in everyday discourse. Knowledge of these errors would enable the student to become a more critical thinker.

The acquisition of the skill required in logical thinking became paramount. Logic teaching became content, rather than concept, oriented. As with most rote learning, the essence of the desirability of the skill was lost in the desirability for the acquisition of the skill itself. Evelyn Sharp stated:

> Children can be taught to count, but an understanding of number is something they must develop for themselves out of their own experiences (p.29). ...reciting names of the numbers in order has about the same relation to mathematics that reciting the alphabet has to reading (p.33).

A secondary problem arose in that the student forgot the content after the unit on Informal Fallacies was completed.

This required lengthy review before final exams. The indication was that the method of traditional lecture-exercises-test was not accomplishing the desired goal: teaching and learning of content which would be meaningful and useable in everyday life outside the classroom.

A new method for teaching Informal Fallacies in Logic had to be designed and tested. The method devised was a game which took the form of a court-room trial during which the entire class was to participate and contribute. The trial involved the student in a cognitive learning process. It was expected that transfer of learning would occur in the recognition of errors in reasoning and in other areas of the students' lives.

Approximately five forty-minute class periods were devoted to the development of arguments for the trial in which the Informal Fallacies were used.

Two control groups and one experimental group was used to test the efficacy of the method. Since the researcher taught only one class in Logic during the Spring semester of 1977, the control group used was a class of approximately the same size (thirty students) in the same school, using the same text-book. The other control group also had another instructor who taught in the traditional manner.

The experimental group was given a brief introduction into the material and then set to work at writing up their own fallacious arguments. Approximately the same amount of class time was devoted to the material by both the experimental and the control groups. Both groups used text exercises and tests to establish learning of

the content.

A check on the learning levels acquired by the three classes required an exchange of examinations of the three teachers involved. Each teacher administered his own test to the others' classes. A comparison of success on the tests were made. It was expected that the experimental group would show, if not the same amount of learning acquisition as the control group, then a slightly higher level of learning acquisition. If the same amount of time spent in both classes concerning mastery of the Informal Fallacies yielded no difference in effectiveness of the teaching techniques employed, exhibited through test performance, at least it could be said of the experimental group that they enjoyed studying Logic.

Purpose of the Investigation

The purpose of the investigation was twofold: (1) to achieve a method of teaching Logic which could hold up to criticism concerning content acquisition, and (2) to design a teaching instrument which would agree with the researcher's learning theory which involved a cognitive-field theory of learning. Institutionally, the results of this experiment could be presented to the community college in which the researcher was employed in order to help her colleagues devise more rewarding teaching methods themselves.

Another, distinctly separate purpose for this investigation, was to demonstrate the effectiveness of using game theory to teach Logic to colleagues in the field of Philosophy in the state of Illinois. The results of the findings between the experimental and

control groups were presented to a state-wide convention held at Harper College in March, 1977.

The actual game and a review of the testing procedure were presented to the faculty at large during a meeting in February, 1977. Positive evaluation of the learning level achieved by the teachers themselves was received. A learning exchange was initiated for the faculty cluster meetings as a result of this presentation.

The philosophy of Oakton Community College is one of innovation in teaching techniques. Demonstration of successful technique development is highly valued. All faculty including Deans and Vice-Presidents were invited to sit in on the class while the trial was being conducted.

Information concerning teaching methods involving games in the classroom and cognitive learning theory applications was received through ERIC. Most of the work received concerning games were geared to elementary school students. Further searches yielded simulated society games which are less content oriented than was needed for the work to be covered in Logic. The most useful material was cognitive and gestalt-field theory which yielded some applications of theory to class room technique. Among these were Bruner, Bigge, Tolman, Ausubel, Sharp and Gorman.

The purpose of this investigation then, was to provide adequate support, through testing, for a cognitive approach to learning; to provide information concerning that approach to other faculty in the community college at which the investigation took place; and to introduce a non-traditional method of teaching traditional materials to

philosophers across the state. An additional (or perhaps essential) bonus was achieved in creating a classroom atmosphere which fostered learning, created conditions for new friendships among the students, and provided sustained and meaninful learning of the content of traditional logic courses.

BACKGROUND AND SIGNIFICANCE

The module on Learning Theory and Applications was designed to provide "an understanding of the theories of learning and knowledge from studies conducted in the management of learning so that such information can be applied in the community junior college to benefit of students." (Losak,p.4). Through familiarity with the history and development of learning theory, the various philosophies governing the research and application, and the limitations of such theories, it was possible to understand more fully the nature of the student as learner and the function of the instructor in the classroom. Further value concerning the study and understanding of learning theory was expressed by E. Joan Hunt when she said, "A teacher who possesses (humanistic) qualities may experience frustration unless he is familiar with the materials and practises which relate to the thinking process" (p.2).

Investigation of the literature concerning the various learning theory models made it possible to combine several theories into a working model which could promote learning of complex philosophical material in a humanistic manner. An eclectic position combining both behavioristic and humanistic learning theories contributed to the development of a unit on teaching Informal Fallacies in the formal classroom situation. This practicum was essentially a study in the use of a combina-

tion of both behavioral objectives aimed at minimal mastery through reinforcement models and the use of cognitive theory through the development and use of the higher mental processes of the students. Much emphasis was placed on the design of the program following the developmental stages of the intellect as described by Piaget. Careful progress from the concrete operational stage through the stage of abstract reasoning was charted and followed.

Institutional Perspective

Oakton Community College entered its seventh year in the fall of 1976. It has an interim campus of converted factory buildings and a faculty of approximately 120 members, including vocational-technological and baccalaureate faculty. It is a young institution which has grown from a student population of 500 to almost 7,000.

When Oakton first opened its doors, a faculty of twenty members could easily come together and discuss various problems and methods for solving those problems. With 120 faculty, however, and with the development of the vocational programming available at the community college it became increasingly necessary for the baccalaureate faculty to make their courses practical and attractive to non-baccalaureate students. Students in the vo-tech curricula are required to take a group of core courses in the Humanities, Social Sciences, etc.

The basic assumption made by the course initiator was

that the elitism present between applied versus theoretical studies, (i.e., sciences vs. arts) and between vocational versus baccalaureate programs could be diminished by a course offering which was at once both theoretical and practical.

It must also be noted that Oakton Community College has no departmental structure. It is committed to a policy of interdisciplinary activity. To this end, there are four interdisciplinary Learning Clusters, each of which consists of approximately 30 full-time faculty representing various disciplines. Where possible, two faculty of the same discipline are not assigned to the same cluster. This policy tries to develop cross-disciplinary involvements for faculty and attempts to dissolve discipline jargon, departmental power structures, rivalries and exclusiveness.

The uniqueness of this system is that not only does its cluster system cut across traditional academic disciplines, but combines baccalaureate faculty with vocational-technological faculty as well. The proximity of vocational and baccalaureate faculty allowed for an interchange of ideas which promoted a schema for teaching traditional baccalaureate courses, such as logic in a way which would be non-intimidating to the vocational student and yet be classical in content. Availability of the cluster meeting for a "trial run" of the proposed trial on the instructors themselves indicated the desire on the part of the faculty to exchange ideas for innovative teaching methods and to familiarize vocational faculty with the nature and scope of

the Logic course itself.

Three distinct advantages emerged from the presentation of Logic taught through a game technique: (1) A cluster meeting devoted to a demonstration of the trial in which the instructors themselves participated caused the cluster dean to recommend that similar demonstrations of teaching techniques be offered at future cluster meetings; (2) non-baccalaureate faculty were involved in learning logic and could recommend the course to their respective students through first-hand involvement with the subject matter; (3) baccalaureate faculty 'discovered' the usefulness of teaching content through cognitive teaching methods.

Conversations with faculty members in the communications discipline indicated that their students were having a hard time developing orderly papers. Developing arguments and thinking in a precise mode in order to write cogently was difficult for the communications teachers who were not trained in Logic. Four of these instructors expressed a desire for the Logic instructor to give a presentation to their communications classes concerning objective, clear development of arguments. Through working out the game for teaching content material in Logic, those teachers were taught how to approach conceptual instruction. Some, for instance, had students write an argument supporting the thesis, "Why I should not take a final exam." Many of the teachers involved in the cluster meeting wheen the game was presented devised their own methods for teaching communications in a more humanistic-cognitive manner.

Vocational-technological students take Logic because it satisfies a humanities requirement and because it is the least threatening of the philosophy offerings. Generally it is thought that Logic is similar to mathematics, and memorization of content material is enough to 'get the student through'. Years of conditioning to the one-way communication in the classroom had prepared the students to what Paulo Freire calls, The Banking Concept in Education, that is

> Narration (with the teacher as narrator) leads the students to memorize mechanically the narrated content. Worse yet, it turns them into 'containers' into 'receptacles' to be filled by the teacher. The more completely he fills the receptacles, the better a teacher he is. The more meekly the receptacles permit themselves to be filled, the better the students they are (p.14).

During the investigation of the literature concerning Learning Theory and Applications, many questions presented themselves. These questions had to be separated out and addressed individually if a cohesive approach to education in Logic was to emerge. Unless one held a clear view of the meaning of learning and of the objectives to be achieved in the classroom within that theoretical framework, a position concerning the goal of the teacher and how that goal fit into the community college's mission would be impossible to effect.

Some of the questions concerning the selection and implementation of a learning theory appropriate to teaching Logic were:

(1) What is the nature of learning?

(2) What is the nature of the learner?

(3) What is the nature of the teacher?

(4) What particular problems does learning Logic present?

(5) What strategy should be employed to implement the learning desired?

(6) What is the goal of education in relation to Logic?

(7) How can achievement be evaluated?

This section of the practicum will address itself to answering these questions in order to provide a braod theoretical base for the practical value of the use of games in the study of Logic.

The nature of learning

The module on Learning Theory and Applications concentrated on different approaches to learning by various psychologists with historical background drawn from the philosophers. Most of these theories applied their own definitions of learning to approaches to teaching which would complement the type of learning defined in the first place. In Logic, this type of reasoning is called, "circular". Learning was defined as:

(1) A change in behavior which "occurs through stimuli and responses becoming related according to mechanistic principles.

(2) A process of gaining or changing insights, outlooks, expectations or thought patterns" (Bigge, p.11).

(3) A change in the understanding of significant problems and situations (p.13).

(4) Learning identified with knowledge, not action. Knowledge is stored when needed, that is, "Hidden in contrast to manifest" (Bugelski, p. 107).

These differing views concerning the nature of learning reminded the researcher of the three blind men who, upon examining an elephant came up with descriptions of the elephant compatible with the part of the elephant they were touching. All three of them were operating within a limited context and, had they compared their findings with each other, they may have arrived at a reasonable synthesis which could approximate the actual elephant. As in the case of the learning theorists, a synthesis had to be made in order to approach teaching Logic from a concrete up through formal operations.

Learning theory goes back to Plato who tells of Socrates' disappointment in a famous teacher of the time. Anaxagoras was to explain to Socrates how, "mind was the cause and disposer of all." Instead of telling Socrates how the mind controls one's actions, Socrates recalled:

> When he endeavored to explain the causes of the actions of Socrates in detail, went on to show that I sit here because my body is made up of bones and have joints which divide them and the muscles are elastic, and they cover the bones...(Phaedo, pp. 482-3).

This explanation relied on <u>a posteriori</u> reports of observable data. Such explanations are the stuff of science. Anaxagoras' explanation closely parallels the S-R theories of Pavlov and the CS-CR theories of B. F. Skinner. Certainly these approaches are

molecular or atomistic because the theorists themselves are materialists. Since the mind is not an observable, material entity, to try to explain it in other than its observable, material manifestations was bound to cause theoretical problems.

Socrates was, of course, looking for answers to such questions as, "How do we know" and "What do we know"? He was a rationalist where Anaxagoras was a materialist. The same dualism exists today in modern learning theory.

> Empiricism gave rise to experimental methods of psychology. Behaviorists led by Watson substituted observable stimuli and responses for mentalistic ideas and images. But the associationistic cast of the 'acquisition mechanism' remained (Hilgard and Bower,p.7).

Hilgard and Bower carry on the distinction between the rationalists and the materialists (empiricists) by explaining that the rationalists believed in reason being the prime source of knowledge, where the empiricists believe that ideas are passive copies of sense data. "The rationalists believe sense data is the raw stuff formed later by innate perceptual assumptions with which the mind begins (p. 7). Here was also the difference between <u>a priori</u> and a <u>posteriori</u> <u>knowledge</u>.

Basic theories of epistemology, from Plato's cognitive theory to Hume's 'Association of Ideas' through Locke's theory of the <u>tabula</u> <u>rasa</u> (blank tablet) were intimately involved with the psychologies concerning how learning was affected (Boring, pp. 157-270).

The theory of the mind being a <u>tabula</u> <u>rasa</u> fitted well

with the concepts of behavioral psychology. Research revealed two basic assumptions upon which all subsequent learning theories evolved: (1) the mind could understand through its own activity (a priori reasoning) and (2) the mind's operations are indicated through overt manifestations and indeed, does not function without them (a posteriori reasoning).

It became increasingly clear that the various theorists were not talking about the same phenomena. The cognitive-field theorists along with the humanists, address the first, while the behaviorists study the second.

The study of learning theory brought the researcher to the same frustration level of Socrates when he investigated Anaxagoras' answer as to why he was sitting in jail. Most of the investigatory work found behaviorism to fall short when applied to the higher mental processes. On the other hand, an investigation into the cognitive-field theories of Tolman, Kohler, Werthiemer, Dewey, Whitehead, Hume, Locke, etc., fell equally short when a theory concerning habit training for skills was needed.

> There is a great philosophical schism between the various theories of learning which causes us to get bogged down with a theory. One issue on learning theory deals with an operational definition, which tells us essentially how it occurs. The studies which deal with the acquisition of learning still predicate their experiments and theories on that "It" which is the learning itself. Other studies concentrate on what "It", the learning actually is (Bigge, p.13).

The literature clearly indicated divergent opinions con-

cerning the nature of learning, and how such learning was to be achieved. A new force emerged in the field of learning theory which would involve itself in a humanistic approach to learning and teaching. A synthesis between rationalism and empiricism had already occurred in Hume's epistemology. Hume granted that the observation of empirical data in the formulation of an "association of ideas" was itself not empirical. The Gestalt t heorists and the Humanists showed us that the learner is not a passive receptacle of data. The biological objectivity once highly valued as scientific remains, however, tenaciously in our approaches to the learner.

Hume's epistemological theories were absorbed into modern psychology under the terms, "stimulus discrimmination" or "concept formation" or "pattern recognition" (Hilgard and Bower, p.6). Locke also granted, even though he propounded the theory of the tabula rasa, that the mind is more than a mechanism which is a "passive recorder of the sequences of the sensory impressions." This empirical view gave rise to the theories of Watson who substituted the concept of ideas (phantasms) with observable stimuli and responses. Phantasms are, however, concrete and specific while concepts are generalized configurations.

The desire to make psychology a "science" led theorists to reject the idea of mentalistic concepts and to concentrate on observable data. Skinner advanced the idea of learning as

a conditioned response to a given conditioned stimulus. Both elements being totally observable and controllable which gives rise to predictable patterns of behavior which could be repeated within a laboratory context where the environment is controllable and manipulatable. What is not observable however is the the dynamic whole, the field, which contributes to learnings through a conceptualized, non-concrete understanding.

Nature of the learner

Implicit in the idea of behaviorism was the notion that the learner was passive. "Associationistic" theories are misunderstood in psychological literature. Hume and Locke's theories predicate an active recipient to external data. Tolman's field theories addressed an active participant to the learning process, but he also recognized the value of the stimuli external to the learner. The learner was then described in terms of motives, expectancies, cognitions, and intentions (Hilgard and Bower, p.122). A teleological approach to the learner was being employed which was molar rather than molecular.

> Insight is environmentally shaped; yet no one else has done it to me or seen it for me. It is an act of creation between me and my environment - and what else should my 'free will' or autonomy mean? These acts of insight, or closure, or 'hierarchical jumps' in complex systems, are not predictable from the separate precursor steps, either from inside or outside the system (Platt, p.44).

In other words, the act of 'closure' takes in the whole, not part, of the organism in relation to himself and his environment.

There is no question of the value of reinforcement in learning, however Skinner's behavioral mode left serious questions concerning the nature of learning and the participation of the learner open.

> The cry will be raised that the child is being treated as a mere animal and that an essentially human intellectual achievement is being analyzed in unduly mechanistic terms. Mathematical behavior is usually regarded, not as a repertoire of responses involving mathematical ability or the exercise of the power of reason. It is true that our techniques...are not designed to develop the mind or to further some 'vague understanding' of mathematical relationships. They are designed, on the contrary, to establish the very behaviors which are taken to be the evidences of such processes...(Skinner, pp. 86-87).

The initial assumption concerning the nature of learning i.e., that learning was an observable phenomenon, did not account for the possibility of latent learning or for closure. Understanding this type of learning is essential. If the classroom teacher who had been exposed to replicating the model of stimulus-response-reinforcement in her classroom technique disregarded the possibility of latent learning, categorization on the part of the learner would be neglected. If one regarded the student as a passive learner the required teaching technique would reinforce specific behaviors and avoid the possibility of conceptual hierarchies. Accomplishment of modified behaviors required nothing more on the part of the learner than to be a depository of 'right' answers preconceived by the teacher. Little or no room is left for the learner to add to his own learning or to be active in its reception. This is known today as traditional

teaching. These theories did not account for what Tolman later described as 'latent learning'. The individuality of the learner was being obliterated and creativity being stifled.

More recently in learning theory, the idea of the student being passive is being attacked:

> The individual is being championed for his or her own worth and not for their fitting into pre-determined schemes. Even pigeons trained to play ping-pong in the laboratory will seldom choose ping-pon when released in their natural habitat.
> The philosophy of behaviorism is heavily burdened with problems of how to get low-willed animals to do what the researchers want by manipulating their access to basic necessities. In schools this is exemplified by reading programs that pay children pieces of candy to read things they do not want to read (Samples, 1972,p.40).

> The reinforcement principle does not involve any knowledge of the internal structure or states of the brain or even the genetics of the organism. These factors will of course limit or guide the responses of different organisms (Platt, p. 41).

> Man's mind is not simply the passive repository of past events, nor does man's mind stop operations with the explanation of some present situation...It (the mind) needs to cognate and create. Often neglected by the students of cognition is the highest of the higher mental processes (Arndt, p. 278).

> Skinnerian objective determinism, like the determinism of most scientists today, does not and cannot include the total existential and subjective framework within which it has it validity. The primary interaction of ourselves with the world, which precedes all determinism, must also be put in if we are to have a total picture of man (Platt, p.46).

This researcher discovered that there was a movement to counteract the prevalent psychological view of man as a mechanism materialistically determined by observable law. Each psychologist who respons to behaviorism is advocating an expanded

view of mankind. Once the psychological foundation for man as a passive receptor of knowledge is cracked, applications of classroom technique would have to accommodate themselves to that expanded view of man, which in turn, would result in a change in the approach to teaching. That change would necessitate the teacher's role changing to one of a facilitator of learning.

> Theories of learning (like much else in psychology) rest on the investigator's conception of the nature of man. In other words, every learning theorist is a philosopher, though he may not know it. To put the matter more concretely, psychologists who investigate (and theorize about) learning start with some preconceived view of the nature of human motivation (Allport, p. 84).

The researcher discovered that just as it is difficult to understand her role as a teacher and the students' role as a learner without firm grounding in learning theory, it was equally difficult to understand learning theory without a firm grounding in epistemology. While some theories of learning deal with the known, others deal with knowing. The schism is marked by theories of latent learning and closure. This schism also delineated the various learning theories as being either descriptive or prescriptive.

Although it is true that latent learning cannot be distinguished until it is made objectively manifest, Tolman insisted that some learning had been affected before such behavior was exhibited. An illustration of latent learning may be found in Helen Keller's description of how she learned to imitate the

manual alphabet through a forms of CS-CR employed by her teacher, Annie Sullivan. Keller says that she learned to "imitate, in monkey like fashion" (p. 24). But the dawn of awareness and understanding did not occur until much later when she learned the nature of abstract categories through a difficulty with her teacher over the distinction between the concrete presentations of "mug", "milk", "water," and "drink". There is no question that the experiences of all four phenomena were in her memory traces, but a higher level of learning, the cognitive level, is achieved through individual effort and understanding. It had taken Keller three months to learn eighteen words at the concrete level. With insight into the cognitive hierarchy, she learned thirty more words in a few hours. Sullivan called this a breakthrough in her learning. We cannot see this process, merely hypothesize about it.

The behavioral approach concerning the nature of the learner was simply not enough.

> Each discovered phenomena has moved us forward in our knowledge about learning. At the same time, no one has succeeded in providing a system invulnerable to criticism. The construction of a fully satisfactory theory of learning continues as an uncompleted task. But this is the nature of science. The only completed field of research is a dead one (Hilgard and Bower, p.27).

There is no question of the need for skill to be taught and learned. If we are to understand Samples, these can be taught to lower-willed organisms through behavior modification. We can teach letter recognition and habit to the young through the Skinnerian reinforcement models, but that is not the goal of

education or of learning. It is merely acquisition of a type of learning needed at the lower end of the learner's cognitive spectrum.

Piaget, for example, delineates the differences in the stages and types of learning and their specific content orientations. These levels of intellectual development indicate that learning in the human being goes beyond the so-called, "lower-willed" animals. Piaget saw learning in the human being as a developmental hierarchy which was hinted at by the earlier cognitive theorists. The stages are:

(1) The sensory motor stage - birth to two years.

(2) The preoperational or representational stage- two to six years.

(3) The concrete operational stage - seven to eleven years.

(4) The formal operations stage - twelve to fourteen years (Piaget, 1963).

It appeared that most learning and teaching techniques, particularly the traditional methods, were inhibited beyond the third level of Piaget's hierarchy.

> S-R conditioning theorists interpret learning in terms of changes in strength of hypothetical variables called S-R connections, associations, habit strengths, or behavioral tendencies; Gestalt-field theorists define learning in terms of reorganization of perceptual or cognitive fields or systems. Consequently, whereas behavioristic teachers desire to change the behaviors of his students in a significant way, a Gestalt-field oriented teacher aspires to help students change their understandings of significant problems and situations.

> Cognitive field theory has been developed as an emergent synthesis that both benefits by (Bigge, p. 13).

Interestingly enough, a new force stimulated by Bruner and Samples suggests the possibility of a fifth stage over and above Piaget's theory, i.e., metaphorical or right-brained thinking which is non-verbal. In a review of Samples' work, Weingartner explains the brain has two hemispheres. It is the left hemisphere that is

> conventional and logical which tied us to a kind of reasoning that is mechanistic and circular. Schools have condemned anything resembling intuition and despite lip service to the contrary, have punished creativity (p.20).

In Human Nature and Conduct, written in 1922, Dewey challenged this same approach to the human being as a mechanistic, predictable, collection of primary instincts when he said

> The tendency to forget the office of distinctions and classifications, and to take them as marking things in themselves, is the current fallacy of scientific specialism. It is one of the conspicuous traits of highbrowism, the essence of false abstractionism. This attitude which once flourished in physical science now governs theorizing about human nature (p. 132).

Thus, the nature of the learner, in particular the human learner, goes beyond the scope of what pigeons and rats have been capable of learning in the laboratory. No one would expect a pigeon, for instance, to build a conceptual framework concerning political institutions. It may be that these levels of learning correspond to the phylogenetic hierarchy. We know, for example of Kohler's work in The Mentality of Apes, that apes function with a sort of 'insight' which is something more than

the pure operation of memory. Insight may even be a purposeful manipulation of memories.

Rudolph Flesch, in The Art of Clear Thinking, states, "your mind doesn't register what's in front of your eyes, it's your eyes that register what's in vack of your mind" (p. 22). Flesch was pointing out the importance of a gestalt, a whole which is brought to the experience in order to render that experience meaningful and usable.

> Some degree of organization is indespensible to even the lowest grade of life. Even an amoeba must have some continuity in time in its activity and some adaptation to its environment in space. Its life and experience cannot possibly consist in momentary, atomic and self-enclosed sensations. Its activity has reference to its surroundings and to what goes before and what comes after. This organization intrinsic to life renders unnecessary a supernatural and superempirical synthesis. It affords the basis and material for a positive evolution of intelligence as an organizing factor within experience (Dewey, 1957, p. 91).

For Piaget, then, the role of habits are important. He terms them "schema" which the organism forms in order to assimilate it with its environment. These schemata involve the processes of adaptation and organization. As the learner continues upward in the learning hierarch he learns,

> increasingly to represent the world mentally by means of memory, imagry and language...until in adolescence may proceed entirely in imagination without recourse to overt actions (Beard, p. 19).

Samples argues against Piaget's theory. He believes this theory is restricted to the left-side of the brain. In Samples' "synergistic-comparative" mode, "Standard rational comparisons... discover relationships in situations external to itself" (Wein-

gartner, p. 70). Thinking, for Piaget, is an "internalization of action." For Samples such thinking is restricted to the left-side of the brain. In Samples' "synergistic-comparative" mode, "Standard rational comparisons...discover relationships in situations external to itself" (p.70).

Samples recommends going beyond verbal training of the formal operational stage. For him there is a "cognitive" domain which is the domain of thought and reason and the "affective" domain which is the domain of feelings, values and notions of self-worth. Unless both hemispheres of the brain are used, that is, if we continue to train left-brain functions exclusively, then Samples feels we will lose the "natural good habits" which exist in both the verbal and non-verbal domains.

The learner does not come to school as the rat or pigeon comes to the laboratory, devoid of myriad experiences.

> Children bring to their first day of school a wide variety of learning and of inhibition against learning. Beginners are very unequal, even those from families with the same cultural and economic background. To a large extent, they differ because they have had different experiences that either stimulate or ignore mental growth (Sharp, p. 15).

Here again, we see that the learner becomes different from what is to be learned and that the learner is in charge of what learning will take place. This is not to say that the student cannot be conditioned to provide the 'right' answers to questions but that those 'right' answers are trivia in the structure of the learner's schemata. "Children can be taught to count, but an understanding of number is something they must develop for them-

selves out of their own experiences" (Sharp, p.29).

The learner is primarily responsible for how empirical data is to be organized and this organization passes through the stage of concrete operations to the stage of formal operations. Formal operations are the goal of every educational system, not the exhibition of concrete operations.

> The development of critical thinking has figured as an important objective in education for a long time...(it) has been handicapped by several questionable assumptions. One widely accepted assumption is that reflective thinking cannot take place until a sufficient body of factual information is accumulated. Teaching which follows this assumption stresses factual coverage and burdens the memory with unorganized and perishable information (Taba, p.524).

Apes, pigeons and rats can accomplish the concrete operational goals. It is at the formal level of operation that reason is addressed an this level cannot be encouraged in the classroom unless an understanding of the nature of learning and the learner dictates the applications which are used to enhance conceptual, abstract, analogical thinking.

> Each person makes his own concepts. The easiest way for him to make them is through directly perceiving the thing (referent) itself, not through listening to someone else's words. Discussion is different from telling...(Woodruff, p. 238).

This perceptual approach to learning is in fact a misnomer. A more apt label is conceptual, i.e., the learner is differentiating essential characteristics in order to form intelligible categories.

> Categorization is assumed to reduce the complexity of the environment, make possible the recognition of objects, and eliminate the necessity for constant

> learning. In addition it permits an individual to go beyond the information given (Lefrancois, p. 115).

Carl Rogers advocates this individual learning mode with the teacher termed a "facilitator", rather than as a "Mug" which fills the empty "jugs" of the students' minds. Cognitive development in the human being relies precisely on this highest level of the though processes so that the organism may understand and function in his world. It is precisely this mode of thinking which the traditional teacher avoids while presenting content material in the classroom.

> ...a concept is not an actual concrete entity in nature, it is a "construct" something made by a brain, in the effort of the person to understand something and to cope with it. A concept cannot be literally handed from one person to another; but this is exactly what teachers often try to do! (Woodruff, p. 238).

This type of thinking, the assumption that facta are the important details of education has resulted in the dehumanization of the human being and of the educational process.

> Nonsignificant things can be learned by rote, but significant learning is not the acquisition of bits and pieces, facta and responses. Truly important learning involves the entire person; it is very real and vital (Arndt, p. 299).

The Nature of the teacher

The teacher has certain expectancies and goals in her approaches to the classroom. In the Community College of the 1970's a new situatior has emerged. Technology and the push for egalitarianism in education placed in the classroom many distinct types of students. Non-traditional students whose ages spanned

from twenty-five to eighty years of age; traditional students whose financial backgrounds prohibited attendance at more expensive, private schools but who were baccalaureate candidates, and vocational students whose formal schooling stopped at the stage of concrete operations. Variety of student interests and ability found its way into each Community College classroom. This broad range of intrest and ability certainly found its way into the average Logic course.

If the researcher's understanding of education involved a concept that Logic should be content, rather than concept, oriented, and if that course in Logic was a formal philosophy course transferable to senior institutions, then 3/4ths of the classroom population would be eliminated from her expectations for the course. That is, philosophy would be taught as an academic discipline with little reference to the worlds of the students who were non-baccalaureate. If, on the other hand, the instructor believed that education, particularly education for survival in todays world, required each and every student to think critically, apply logic to everyday occurances, employ standards of orderly thinking to the individual student's cognitive domain, in other words - to get something out of the course - then a different attitude concerning the nature of the course had to be affected. This could be achieved through a non-traditional teaching style. A social approach to learning had to be developed if the subject was to be socially useful.

In teaching philosophy, the instructor practising Socrates' art would involve the student in the process

> of critical thought itself. Teaching philosophy cannot essentially involve students memorizing and repeating on request the ideas or their answer to life's problems. Teaching philosophy cannot essentially involve students memorizing and repeating on request the ideas of others...
>
> Today, as in Socrates' day, there is a need for midwives for ideas. The labors of the mind in producing such ideas appear overwhelming in the eyes of many. The effort required alone appears sufficient reason for many to practise a rigorous intellectual contraception...(Pecorino, p. 16).

The important distinction here is that if the classroom itself didn't exemplify the importance of individualization in learning, how would the individual learn anything that was worthwhile to him? If the teacher understood and believed in the theory of conceptual learning as individual, then the classroom also had to reflect that philosophy. "...it is the conditions under which goals are reached and under which they are established through learning that are the fundamental problem" (Guthrie, p.139).

> Much of the intellectual apathy we complain about is due to our fault of presenting conclusions in lieu of first-hand experience. To us, our well-chiseled conclusion, summing up a long intellectual struggle with a problem of knowledge or of value, seems like a beautiful sonnet. To the student it may be gibberish. Teaching, then, is not the art of offering conclusions...(Allport, p.18).

It may very well be that as the learning process evolves through the stages of Piaget's cognitive hierarchy, each individual unit of learning must proceed through those stages also. The additional problem of a varied student body requires the teacher to adjust her value system to include the nature of the student

being taught as well as the nature of the student. This does not mean, however, watering down the substantive content of the course; the teacher's respect for education does not allow for this. It does mean readjusting preconceived value systems for her subject and students in order to include a more holistic attitude toward the classroom.

> As educators, we find it extremely important to identify the conditions under which each of these theories can be applied most fruitfully. First, one must examine the nature of the objectives. More than half of this controversy can be resolved not at the level of which is the better psychology, but at the level of evaluative philosophical judgements (Shulman, p. 225).

The controversy does not involve what is to be taught. When one teaches Logic, the substantive content is Logic. The controversy revolves around the purpose for which it is taught in the first place, and how to implement that purpose. Here it is necessary to bring in the nature of the teacher herself.

> Teachers too, have cognitive styles, and they tend to teach by the methods most comfortable for them unless they are consciously attempting to use a teaching strategy to accomodate student learning styles. A major dimension of faculty teaching styles is the didactic versus the evocative style (Cross, p. 128).

Particular problems in teaching Logic

Community colleges find themselves faced with two distinct types of graduates from modern High Schools: graduates of Survival High can't read because they have been tracked in a program at the local high school which taught him career skills or which regarded the student as, "hopeless" for academic subjects; and graduates of 3 R's High, who were highly adequate to the

tasks of reading and writing, but when it came to higher levels of cognition, they were deficient. It seemed that the graduates of 3 R's High couldn't think and the graduates of Survival High couldn't read. The teacher who held fast to a teaching style which precluded the necessity of all students to have both faculties developed was doomed to failure.

In the four years this researcher taught Logic prior to using the game technique, not only was Logic her least favorite class, but the attrition rate in those classes was about forty per-cent. In other words, the students voted with their feet. Samples indicated that even though you could teach pigeons to play ping-pong, that did not necessarily mean they would play at it during their free time. If they would not, then why bother to teach them how in the first place? Why bother to educate in the first place? An evolution in the thinking of the researcher required her to re-evaluate her goals, her educational philosophy, her teaching methods and her knowledge of educational psychology.

> The community college teachers tend to be evocative whereas university professors tend to be didactic... whereas community college teachers emphasize individual attention, student participation in class and the personal development of students, university faculty emphasize subject matter, lectures and task oriented classes...Community college teachers are significantly more likely than university faculty to describe objectives at the beginning of each class session...(Cross, p. 129).

The nature of the community college student body requires a more eclectic teaching perspective than the teachers received in the halls of academia. Desire to communicate the subject matter because of an inherent interest in it, combined with the

necessity of teaching enough content to justify transferability for baccalaureate students required a traditional approach. Desire for the course to be meaningful and rewarding required a non-traditional one.

Teaching strategy

The need to incorporate both behavior modification and a cognitive learning style was made manifest by the unique problems presented to the Community College faculty, particularly those who taught traditionally academic subjects. How could a method, employing both techniques, which seemed at the outset to be so divergent be devised? It was obvious that the traditional approach of lecture-notes-quiz was not working, nor was it enjoyable for the teacher or the students.

> The sad truth is that while some teachers seem 'intuitively' to understand and utilize these concepts (of behavior modification) the vast majority do not. 'Intuitive' teaching, as a matter of fact, is probably not intuitive at all, but rather an indication that the teacher is untutored experimentalist. That is that he or she is able to try something, recognize whether or not it worked, and then make changes accordingly. The problem with this is that the teacher may never question why it worked. Without a conceptual understanding, it is difficult to generalize from one situation to another. This, of course, is why we need to teach teachers concepts rather than formulas (Warshaw, p. 39).

Although some theorists belong to a group which believed in 'natural unfoldment,' they relied on negative or permissive education which centered on feelings. It was the researcher's estimation that the results of this type of education were the graduates of Survival High who lacked basic learning skills and tools. On the other hand, the behaviorists showed that if complex behaviorisms were

to be taught, the researcher could patiently wait for the appropriate behaviors to be exhibited and that "either or both the rat and the experimentor would die of old age before the desired operant appeared" (Lefrancois, p.69). The regular semester was only sixteen weeks long!

> The goal of the educator, then is to shift the content of the subject he teaches from the opportunistic (matter of fact) layer to the propitiate. But there is no sure-fire, mechanical strategy to use. The best general rule, one that John Dewey said clearly, is to strive ceaselessly to integrate routine matters of fact into the growing experience system of the child himself (Allport, p. 18).

The strategy for teaching content in Logic and conceptualization for the outside world involved would take into account the need for basic skills, which would be introduced by drill, reward and reinforcement. This however, was not the goal to be achieved by either the student or the teacher. A second, more important task would involve the student himself as a gestalt, a whole, who leaves the classroom and must integrate his learning with the world. He would be introduced to a type of learning which would render him a critical thinking, analytical concerning "his personal behavior which would include a lack of suceptibility to propaganda"(Hunt, p.2). In other words, the skills which are desired at base would serve to integrate the subject matter of the classroom with the individual's personal life and understanding outside of it.

The strategy for introducing this level on the hierarchy of learning, the formal operational level, would presume a modicum of skills concerning the informal fallacies commonly taught in Logic.

It would require the student to apply knowledge of them to media other than a text or quiz. A humorous story was devised concerning a student quitting college. The students were required to point out the fallacies in reasoning - this method was similar in kind to the quiz method except that the reference point was a college student to which the logic student could identify. A concrete example at the beginning of the hierarchy of learning. A less painless test, if you will. A second method used was story-telling. A classroom reading of "Love is a Fallacy" by Max Schulman was presented in class. All of the fallacies were familiar to the students. They had to listen, and were not tested on the material at all. The rewards they experienced were those of enjoying an intellectual parody. A metaphoric example. The pleasures of learning were evident on the faces of the students. Overt rewards were no longer necessary since the students were getting internal rewards from themselves instead.

Thee techniques approximated the 'shaping' technique developed by Skinner which

> Administers rewards for the responses that are not the required terminal response, but which approximate what the experimenter desires. The technique is aptly referred to as the different reinforcement of successive approximations (Lefrancois, p. 69).

The shaping, however, leads directly to the experiment in teaching logic through the game technique in order to 'solidify' the learning into a cognitive, useful whole. Furth stated that "in traditional logic there is the danger that learning of symbolic rules comes first and comprehension lags behind (p.59). With this

that is, avoiding 'raw facts', by "organizing facts in terms of principles and ideas from which they can be inferred is the only way of reducing the quick rate of loss of human memory" (Bruner, p. 49). This strategy presents the student with a satisfying state of affairs through which he can apply his own, internal logic, to the organization of material. This strengthening could be affected in two ways, through the law of exercise, that is repeating the connection (Bugelski, p. 51), but the connection had to ascend on the hierarchical scale from concrete operations to formal in order to be integrated.

This section of the practicum described the theoretical strategy employed for teaching logic. The specific strategy used for this study appears in a later section of this paper.

The goal of education

As was stated above, learning, in order to be effective must be applied to the world of reality, not just an exhibition of knowledge in an isolated classroom atmosphere. Making this goal attainable to the average student also creates motivation for that learning. This creates a large loop which is self-perpetuating.

> The best way to create interest in a subject is to render it worth knowing, which means to make the knowledge gained usable in one's thinking beyond the situation in which the learning has occurred (Bruner, p.73).

If we can teach pigeons to play ping-pong, we are justified in asking a most important question - "So What?"

...a student may, for instance get an "A" in psych-

> ology, but when he arrives in the classroom as a teacher he may not use his learnings or even think of them in an actual human situation, one might question the value of his having taken such a course in the first place (Gorman, p.13).

Bruner said in, The Process of Education, "the first object in any act of learning, over and beyond the pleasure it may give, is that it should serve us in the future" (p. 58). Education is essentially for survival. The first time a father told his child, "Watch out for that yellow-striped thing, it will eat you," education was born. It helps us to understand and function in our world. It helps us to survive. Any course of study which does not attempt to make that link with the outside world is rendered meaningless and may indeed not be education at all. John Dewey, in his call for a Reconstruction in Philosophy states,

> Full education comes only when there is a responsible share on the part of each person, in proportion to capacity, in shaping the aims and policies of the social groups to which he belongs (p. 211).

It is important, says Dewey, for the intelligence of mankind to solve the problems that face him in society, not to withdraw from them. Hutchins, too, writes about the need for education to be concerned with the future. We cannot teach facts about the future, we can only draw on the present to understand global and technological change. Even though we know or will know how everything works, what good will that knowledge do us? Carl Rogers felt that "individual rigidity and restricted learning are the surest roads to world catastrophe" (p. 27). In other words, the goal of education is for survival in a world that is, "new and growing newer every minute" (Hutchins, p. 4).

Education, through its support from Federal and State funding and from its inception in this country by Thomas Jefferson, has taken on the role of socializing the individual, of turning him into a good citizen, of making that citizen aware and moral, and of providing him with the intellectual tools necessary to survive. Education is also turning out graduates in occupations, even though those occupations may not exist in the future due to ever-increasing computerization. The goal of education is to produce a fully functioning, supple, intellect which can absorb the high-speed, stress filled, drug dependent society it lives in and convert it into a richer, more meaningful life. This may indeed be a requirement for the increased leisure we have gained through that technology. If what the student learns in the college classroom is disconnected from what goes on in the world outside that classroom, then the very essence of education is negated. (Cross, p. 21).

> Many students, perhaps the majority in American higher education still accept the irrelevance of college studies to their lives. A complete divorce is made between living and learning. What students study has little relationship to how they live or what they believe in (Dunham, p. 88).

This type of education has led precisely to the problems cited in the preceding. Education for specific facts and data is not education at all. It renders the world outside the classroom alien and meaningless, or else it renders the classroom meaningless and alien. Education for survival is essential, but the type of education which is specific and concrete is appropriate only to the beginning stages in the hierarchy of learning.

Concrete operational knowledge must eventually serve a higher cognitive structure. The very fibre of education is being rent from within through the teaching of data without carrying that information up through its natural categorization. Without that essential step in learning, the world remains a disorganized, incomprehensible chaos.

Evaluating performance

Organizational constructs are not objectively manifest. Individuation in a classroom of thirty-six pupils is almost impossible to measure. However, we can measure what is measurable. Content learning, if it is achieved through a conceptual framework is generally more permanent than memorization and rote learning. Material that is memorized specifically for a test is usually forgotten immediately after the test. If the material is learned through the associative process, the content should become a part of the individual's cognitive structure, and therefore more permanent. One way to measure this learning is through testing for content received both through concrete, behavioral modes, and through the conceptual mode. This was done through testing three groups of students, two groups were taught in the traditional lecture-notes-format, one group was taught through the cognitive hierarchy. It was shown that the group taught through the game method (cognitive) came out with higher test results than those in the control groups.

There are other measures for success than testing for content. In the preceding other goals, instructionally, institutionally, and

societally are desirable. Evaluation of these was more subjective than testing but equally valid. They are:

(1) relaxed classroom atmosphere

(2) group and peer interaction

(3) group and peer teaching and learning

(4) development of awareness and accurate reasoning

(5) knowledge that learning can be fun

(6) improvement of teaching within the confines of traditional content material

(7) increased regularity of attendance

(8) dissemination of more practical use of classroom learning

(9) sharing of innovation in the classroom with other faculty.

PROCEDURES

Previous experience in teaching Logic led the researcher to realize that classroom work in logic was not carrying over into other areas of the student's lives. Classes were dull and lifeless given over to the memorization of material and unimaginative testing which did not spark the students' natural eagerness for novelty.

Students at Oakton Community College are from a variety of age ranges, in one class the students' ages ranged from nineteen to eighty-five. Interest, intelligence and experience was diverse. A single teaching technique could not satisfy a myriad student population. Past experience also indicated an extremely high attrition rate. In one year, over forty per-cent of the students did not complete the course. Although Logic is natural to every rational human being, in the classroom it was boring. A procedure had to be developed to save the class and the teacher from that boredom.

From Instructor Centered to Student Centered

The Informal Fallacies are taught in Introductory Logic courses. They were devised by Aristotle to show the pitfalls which occur in language and which also occur due to irrelevancies between premises and conclusions. Informal Fallacies deal with the structure of the argument per se. Informal fallacies occur most frequently in everyday discourse, in advertising, in political

speeches and in text books.

Through research on learning theory, it became clear that the nature of the learner was not being taken into account in the traditional lecture-notes-test format. Alfred Gorman was talking about this type of class when he said:

> In a strong one way communication in the classroom viewed as a social system you can see the traditional situation in the physical-psychological aspects. Its structure includes thirty students seated in rows facing the teacher who has a larger desk and chair, stand at the front and may, in some cases, have a raised platform on which to stand...All, or almost all, communications flow through him, and he makes most decisions as to process, including what will be done, and by whom it will be done (p. 34).

It was necessary to break this strong, one way communication in order to spark students' interest. The easiest way to stop lecturing is to give the students work which will require some cognitive realization of their own.

An initial period was given over to an introduction of the fallacies, in Latin, e.g., Ignoratio Elenchi, Argumentum ad Hominem, Petitio Principii, etc. This was a traditional one-way communicative process. Pre-testing on the material was impossible since it was completely new to the students. Pre-testing would have been like giving a trigonometry examination to kindergarteners. Certain information had to be introduced in order to progress to the higher mental functions just as the alphabet is introduced in order to learn how to read. However, recitation of the fallacies in Latin is as meaningful at this point as reciting the alphabet is to reading.

In order to introduce the level of concrete operations

to this study, the students were told to use as many fallacies as they could and write an ad for any product they wanted to dream up. The following day, the students read their ads to each other. During this class session, almost no communication was one-way. The students were teaching each other. The ads were amusing and the students enjoyed it. The work was handed in and corrected.

The following day, the students were ready for the next level of understanding, that is, to progress from that concrete stage and start applying the principles they had learned in a non-familiar mode. A quiz was given on the material. It was open note and open book. The students could confer with each other in order to clarify meanings. The instructor was available as a resource to clarify disputes. The quiz took the form of a story concerning a co-ed who went away to college. (Appendix A) The students were animated during this quiz, since they were allowed to collaborate on their answers.

The following day the students read a popular story concerning the use of fallacies in catching a girl friend. It was Max Schulman's Love is a Fallacy. They were told during this class period that it was, "story hour" and that the only requirement was for them to sit back and relax - they didn't have to 'learn' anything. Although this too, was teacher centered, it was done in order to introduce metaphorical, or right-brained thinking. That is, to get the student to muse about all the possibilities in language, its use and misuse. The atmosphere in the classroom was extremely free-flowing. Cognitive organization was

beginning to take form. The students began to realize that learning Informal Fallacies was not just a classroom exercise.

Introducing content material in this manner caused some problems. Changing the classroom structure to be free-flowing and non-centered required time for the students to get used to. Some conscientious students asked when were they going to learn something. They wanted to know when to prepare for the real test. This type of questioning indicated an arrest in development at the concrete stage. A desire for the familiar memorization process, even though the current situation was more enjoyable.

A trial was then devised which would require all students to participate. (Appendix B). The students were counted off by three's. Since there were thirty in the class, that would make each group ten members. There were three sets of litigants in the trial who were fighting over one piece of property and who must each convince a court that their individual group deserved title. The trial revolved around a Black family which moved into a WASP neighborhood on property that was being used by a group of campers for the past thirty years.

The Trial

Each student was a member of a group. He was told to bring in an individual argument pleading for his own cause. A longer argument was constructed from these individual arguments in order to represent the group's view. The individual arguments were later graded for use of Fallacies. The students were required to use every Fallacy, that is, construct arguments using poor

reasoning which had been discussed in class. A lawyer was selected to present the argument of each of the groups to the entire class. Objections were heard from the other two lawyers on the basis of detecting a Fallacy in reasing of the presenting lawyer. An objection was sustained if the identification was correct, overruled if it was identified incorrectly.

All students participated by listening to presented arguments. If any student heard a Fallacy, they were to tap their own lawyer and tell him to object. Each student was responsible for telling the lawyer the nature of the objection. The lawyer was not expected to do all the work for the group.

Three judges were selected on the basis of the previous open-book test which indicated some mastery of the material. The students were also informed that the nature of the trial was a case in litigation at that time, that they all knew what it was about, but it had been 'doctored' in order to disguise the real case. It actually involved the middle-east crisis and the problems surrounding ownership of captured land. When the trial was over, the students were informed of the true nature of the case and shown how irrationality could have crept into the arguments had the students been emotionally drawn into the case.

A tally sheet was kept by the judges. For every fallacy the judges sustained, two points awarded to the team, for every fallacy an opponent discovered, one point was deducted from the presentor and one point given to the objector. If the objection was incorrect, that is, if a fallacy had been incorrectly identified,

the objector would have one point deducted from his team's score. The instructor kept a separate tally sheet and sat in the rear of the room. One group earned over two hundred fifty points, about one hundred and twenty-five fallacies were presented during their argument.

The trial took three days to prepare on the part of the students. Many of them met outside of class time in order to construct their arguments. Because of personal involvement in learning by the students and because of group pressure to hold up their own as members of a group, students gave much more time to content. The students were no longer isolated by age ranges (usually the returning women stick together and the younger students avoid them). Since teams were picked at random, the age groups and sexes were also mixed in each group. The communication in the class was no longer one directional. During the preparation for the trial, the instructor remained in her office. If a student needed her to clear up a difficulty, they could see her there.

Setting up the Experiment and Control

Since the researcher taught only one Logic class in the Spring semester of 1977, two other teachers of Logic agreed to be the control groups. A note went to all Logic teachers on campus to request their assistance in the experiment. (Appendix C) Two of the teachers complied with the request by agreeing to administer a test which was to be given to all of the Logic

students in three classes. (Appendix E) All classes were day classes with the usual divergence in age, sex and experience, and intellectual ranges common in the Community Colleges today. All classes had approximately thirty students in them.

The same material and the same text was given to the instructors prior to introduction of the unit on Informal Fallacies. All three teachers used the same text, but additional information was given, that is the final test itself, so that all three of the teachers would be sure that the same material would be covered.

The experimental group was given one day of lecture, one open-note test and one day to hear the story, Love is a Fallacy, in addition, the experimental group was given a day to view a film, Charge Counter Charge, which is a 40 minute reel of the Army-McCarthy hearings. The students were asked to shout out if they heard a fallacy. It was a noisy session.

The control classes were taught material through the traditional lecture-notes-exercises-quiz format, using the same amount of time in class, including time used for the trial for the experimental group. The final quiz was given as an open-note open-book test in order to relax the students concerning taking a test. The control group had the fallacies listed on the board in order of presentation. It was considered too difficult, by all teachers to expect the students to memorize the names of the fallacies in Latin . A total of three weeks was given to the

unit on Informal Fallacies.

It was hoped that the practical application of the content would foster a more thorough understanding of that content. The results of the testing bore that hope out.

An evaluation sheet was handed to the experimental class after the unit was completed (Appendix D). It was also expected that the peripheral benefits would acrue from teaching logic in this manner.

Limitations and assumptions

Because of the difficulty of having a control group within the correct framework, that is, having both the experimental and control group have the same instructor, other teachers of Logic were recruited to be the control. The basic limitation of the conclusions derived at were noted:

(1) Teaching styles may not have been the same despite the use of experimental method.

(2) Adequacy of the different approaches could not be measured.

(3) Variations in the student population could not be assessed. For example, campus scuttlebutt hypothesized that students in early morning classes are more tenacious than those in other, later classes. The experimental group was an 8:30 A.M. class. No data was available on the student's ability.

(4) The test used for verification of results (Appendix E)

was devised by the researcher. Initially, the control group instructors were to exchange tests but spring vacation prohibited administration of exchange tests.

5. A better evaluation could have been arrived at if the researcher had had more than one class on which to conduct the experiment.
6. Even without definitive results, this researcher expected to continue the use of the student centered learning techniques because of the results of the testing

Other assumptions concerning the validity of the above limitations could be made however. There is no measurable way to detect if the control and experimental group were taught by the same instructor, if that instructor's desire for the success of the experiment would in some way influence the students' attitudes and therefore their achievements. Also, testing alone was not an adequate measurement for the amount of learning. As seen in Tolman's studies, the possibility of latent learning is not to be dismissed if the student's don't perform well on tests. The only measurable proof of this type of learning would be feedback from students at a much later date, perhaps even after the Logic course was completed.

The basic assumption the researcher made was that student-centred learning would involve the student in much more active

learning involvement. This assumption proved to be true. The assumption that the instructor could be used as a resource person instead of a 'teacher' also proved true. There was no need for the instructor to be in the classroom while preparation for the trial was going on. During the trial, the instructor sat in the back of the room with observers from another college. The student weren't aware that either the instructor or visitors were observing.

RESULTS

The results of the trial and its usefulness as a teaching instrument were tested out through administration of a uniform test to the two control groups and the experimental group. The students in the experimental class had higher scores than those in the both control groups. There was a significant difference not only in the test scores, but in the attitude of the researcher's class prior to and after the trial. The students exhibited more openness with each other and the instructor after the trial.

Figure 1

Comparative Test Scores

Correct Answers	Control Group I	Control Group II	Experimental Group
0 - 1	3	-	-
2 - 3	9	2	-
4 - 5	6	9	-
6 - 7	5	3	3
8 - 9	4	2	11
10 -11	-	-	7
12 -13	-	-	3
14 -15	-	-	-
No. of Students	25	27	24

As seen in Figure 1, the experimental group's test scores indicates a higher number of correct answers than either of the two control groups. Control group I had an average score of 4.4, control group II, an average of 4.3 and the experimental group an average of 9.4 correct answers. The difference in average scores would seem to be significant, but the results are not conclusive because:

1. No comparative pre-test had been administered to indicate class ability prior to the unit on informal fallacies in the control groups.

2. No indication of testing in the control groups was noted by either of the other two instructors. The control groups may have had no other tests other than this final test which was written by the researcher.

3. A test prior to the trial was given to the experimental class which showed an average of 6.9% correct answers. The post-trial test indicated an overall increase of 2.5% in correct answers.

4. Pre-test scores of the experimental class indicate the possibility of a higher class average than either of the two control groups. The pre-trial test scores of the experimental class were 2.6% higher than the final test scores of the control groups.

Since the test scores did not render definitive results because of lack in positive control (as stated above) another device was used to estimate the value of teaching through the trial technique. This took the form of a questionnaire given to the experimental class after the trial was completed.

The students were asked to make comments on the value of the trial technique as a learning experience. Following are the comments received from students concerning their experience:

> I have found myself defining fallacies on television programs.
>
> I really enjoyed the trial, not only because it was fun but because it was an excellent learning experience. It was much better than simply memorizing the fallacies because I feel as though I'll remember them instead of just forgetting after the test.
>
> I learned my falicies (sic) better during the trial itself and not only did I learn them but I was starting to pick all of them out.
>
> At times I found it very hard to spot fallacies. When I did find a fallacie (sic) my lawyer blurted out her answer and it was usually wrong and my answer was the right one.
>
> It was hard to contribute to the group trial performance because a lot of answers I recognized at the same time as our lawyer so I couldn't tell her.
>
> I learned a lot about fallacies from this trial experience. I feel that this was an excellent way to learn more about fallacies and it was also fun.
>
> I feel that I could have participated more than I had. I enjoyed this. It was very interesting and a lot of fun. It helped me understand and catch fallacies that are said everyday.
>
> Very good way to learn fallacies. I thought the trial went very smoothly.
>
> After having seen the trial, I think I have learned much better in seeing it then (sic) hearing about it.
>
> I felt that there were only three people in my group who knew anything. I know a lot of the fallacies and contributed as much as possible. I feel I now can use these fallacies in everyday use and I can tell when I hear them.
>
> I learned a lot more from watching the trial, than from participating in it. I'm a silent learner.
>
> I really enjoyed this trial. It was an excellant (sic) learning experience for me in seeing just how fallacies work.

I feel now that I understand better the different fallacies. This was a terrific idea!

I feel that I learned my fallacies best from this trial. I understood them better and easier when I heard them and the argument was brought out instead of reading them.

I felt I could grasp the falacies (sic) better, the more I heard them read. The trial itself was a great experience and a lot of fun. Its a really good way to learn and practice the falicies(sic). (This whole comment is circular!).

The trial itself I consider was a very valuable learning experience and really a lot of fun. Besides - we won!

I think it is something I would have liked to done more of. It is a good learning experience.

My argument was a mor (sic) valid one but wasn't used to the full extent. I'm not acustom (sic) to answering back so quickly their for (sic) I wasn't able to get the fallicies. But I did try!

If we had a little more participation from the group on fallacies, we would have gotten more answers. On a whole, with the few of us, we did excellant (sic).

I felt that I learned a lot while doing this trial. It really helped to understand the fallacies. I feel that I now feel more sure of them. As far as my contribution to the whole argument, I really would have liked to do more, but I had to work and our group met a couple times outside of class. Overall, I really enjoyed this!

I think that I learned a good deal of new fallacies that I never knew before. I never thought that through everyday learning I was actually committing some fallacy. I thoroughly enjoyed this trial.

Great idea with the trial. It helped me understand the falacies (sic) better. Too bad I could not present them quick enough.

I offered as much help as I could. Unfortunately I was not here to do as much as I would like. The trial was great and I learned a lot.

It was very useful. I learned more this way than any other way.

I worked very hard - lived with it, even dreamed about it

and learned one hell of a lot. Did feel I was all alone on case and we neighbors were at a disadvantage because two of our good people were taken for judges.

The nature of these comments on the part of the students was a valuable key to the importance of using student-centered learning. the students overwhelmingly enjoyed the experience and profited by it in their own eyes. Several students remarked on the extra amount of work they put in and others commented on the awareness of incorrect reasoning. If the testing process proved inconclusive concerning the value of instruction which is student centered, then certainly the students' comments would prove its value.

It was also expected that peripheral benefits would accrue from teacing Logic through a student-centered format. This was stated in the 'Goals' section of the previous chapter in this practicum.

1. A relaxed classroom atmosphere was evident. When the trail was concluded, the winning group threw a party for the rest of the class.

2. Group and peer interaction was in evidence during the entire experiment. New friendships were made, and all students, even the quietest, showed interest.

3. Accurate reasoning was exhibited by students during the trial and in individual conversations. One student would catch another in faulty reasoning. A group of candidates running for the Board of Trustees of the College appeared on campus. Reports from students concerning the frequency of the use of faulty reasoning on the part of the candidates exhibited awareness outside of the classroom.

4. Many students learned from each other what they had previously blocked in the one-way communication of information.

5. Knowledge that learning can be fun was shown in the student's general attitudes in class, and their willingness to "try anything new" when Formal Logic was introduced.

6. Although it was premature to expect that increased enrollment would result by word of mouth to the students registering for fall, 1977 classes, what did occur was a marked drop in absenteeism.

7. Dissemination of more practical use of classroom learning was made evident by a student who had a hospital bill reduced $200.00 due to more organized approaches to the argument the financial clerk presented her with. Another student beat a traffic ticket in court, and the third was most interesting. She was a psychology student who found two gross errors in reasoning in her text! This kind of reinforcement to learning could only come from self-awareness and application of the classroom learning to the external world.

8. A mini-trial, using the same material was devised for the faculty during a Cluster meeting. Many of the faculty became actively involved in role-playing and had a lot of fun. The most important off-shoot of this experience was the collaboration with other teachers to devise methods of student-centered learning for other disciplines. Another result was the implementation of future faculty meetings centered around the faculty rather than the dean. That is, faculty members presented learning theories and games to each other at subsequent meetings.

DISCUSSION, IMPLICATIONS AND RECOMMENDATIONS

A logic text tells the story of a boy who was doing the usual young boy type experiment. He noticed that when he yelled, "jump" to a flea, it jumped. Then he decided, (in true scientific spirit) to see what would happen if he pulled out the first set of a flea's legs. He did so. When he yelled, "Jump" the flea jumped. He then removed the second set of legs and yelled, "Jump". Again, the flea jumped. The boy removed the last set of legs and shouted, "Jump". The flea did not move. The boy then formulated a hypothesis concerning the empirical data he collected: <u>When a flea has all of its legs removed, it goes deaf</u>.

In China, around 2800 B.C., "When diseased, an organ would reveal itself by producing pain along a defined path, called a meridian, which was specific for that particular organ. For instance, a disordered heart would be recognized by pain referred typically down the left arm" (Gelfand, p 5). It was not until 1628, almost forty-four centuries later, that Harvey discovered the circulation of the blood, but this discovery was not used to advance treatment in medicine, since what was still in vogue was Galen's theory of vital spirits.

The above examples are indications of how data can be distorted in order to fit preconceived notions. It is possible that educators have been teaching upon a hypothesis which is merely in vogue and not particularly sound. Recent literature in the field of learning and education, particularly in the writings of Samples and Bruner, suggest that education has been directed to the logical concrete, analytical half of the brain. They further suggest that

such teaching has totally neglected an entire hemisphere of the brain, the right half, which is metaphoric and non-verbal. In the past science has shown us that many hypotheses which seemed to be valid have been disgarded simply because they no longer fit. It may be that the behavioral mode of education is one of those hypotheses. Some educators have begun to put the truth of traditional educational dogma to question.

Some psychologists and philosophers still believe that the mind is a tabula rasa, a blank tablet, upon which the environment imprints itself without much else going on to make up the individual. A conditioned-responsive mechanism is what had become of the being "created with certain inalienable rights."

> If one views human beings as purposeful, reflective and creative, as do most gestalt-field theorists, one will have quite a different theory of motivation (Bigge, p. 74).

Teachers who advocate the "Mug and Jug" theory of learning,

> makes sense in an unchanging environment. This is why it has been unquestioned for centuries. But if there is one truth about modern man, it is that he lives in an environment that is continually changing. The one thing I can be sure of is that the pysics which is taught the present day student will be outdated in a decade...by the time the student gets around to using the knowledge made in a firm statement today, it will be modified (Rogers, p.104)

In other words, if teachers' goals are to impart factual information, then that information will likely be out of date by the time the student is out of school. In today's world, those goals and hypotheses have to be reexamined.

As was noted earlier in this paper, Logic classes had been dull and boring to both the students and the researcher. Carry-over from the classroom to the outside world was minimal and the

need for extensive review of Informal Fallacies before the final examination indicated that students' learning was short-term.

If Logic was to meaningful to students, both baccalaureate and vocational, a method of learning and teaching had to be devised which would produce some form of carry-over outside of the classroom - into the world the students lived in. All students in the Community College are not baccalaureate oriented, which meant that courses taken outside a student's particular curriculum should be confluent. Baccalaureate students had to be taught in a manner consistent with the goals of teaching enough content in courses which were transferable to senior institutions.

During the development of this practicum, a reevaluation of goals for teaching Logic took place. It consisted of understanding the nature of learning, teaching and educational psychology. The method of teaching Logic content through games, specifically, a trial, was devised. This method progressed through the concrete operational stages of development described in Piaget's hierarchy of learning in order to arrive at a stage of conceptual understanding where the student can organize his own patterns of understanding. Such learning is generally student-centered and has been shown by various researchers in learning theory to be more permanent.

The trial was highly successful as a teaching instrument. The comparative test scores between the control and experimental groups were not definitive proof of success since the testing methodology contained many shortcomings.

A more reliable guage was the reaction of students to the activity itself. This was assessed by a questionnaire given to the students at the end of the trial. All students responded

positively to the experience. The instructor also felt that the experiment had been successful. It must also be noted that testing of the level of achievement of learning would be inapplicable according to Tolman's theory of 'latent learning'.

The implications of this study were that student-centered learning activities, preferably in small groups, were a valuable teaching tool. The need for the student to organize his own thinking in a mode peculiar to his own needs dictated student-centered teaching techniques. Most new literature in the field of learning theory indicated the need to educate the 'whole' person, not just one side of his brain.

Preparation is now underway in other philosophy classes to rework the lecture-note-quiz format to include small discussion groups centering around student formulated study questions.

Further recommendations of this study have instituted a change in the Learning Cluster meetings of the faculty at Oakton. These meetings became teacher-oriented rather than dean-centered. The meetings, which were not obligatory, have been well attended and informative.

The learning exchange which occurred through these meetings was fostered by an initial meeting at which this researcher presented her proposed trial for the Logic class. In a two hour period, many instructors who had never been exposed to traditional logic learned enough to present mini-units on fallacies to their own classes. The trial stimulated a request for teachers to teach each other during the cluster meetings. In several instances, teachers were asked to collaborate with one another in order to iron out difficulties in presenting conceptual materials to their classes. In parti-

cular the logic instructor helped communications instructors develop a program to teach thesis support.

The administration of the college requested copies of the trial with an explanation of its strategy and goals. Feedback from the administration was encouragement to continue with experimental methods in teaching other courses.

The concept of the trial was presented at a meeting of the Illinois Association of Philosophers in March, 1977. Most philosophers in attendance at that meeting were enthusiastic about the method. Several requested permission to visit the class when the trial was in progress. Two philosophers from other colleges did visit and were impressed with the enthusiasm exhibited by the students. They were also impressed with the lack of self-consciousness on the part of the students when objecting to fallacies in the Latin.

The problem and purpose of this study was to devise a method of teaching Logic which would be interesting to both the teacher and the students. The method would also have to prove, in some way, that content of the course was being transmitted to the students. It was found that more course content was mastered during the trial than through the traditional method. Further comparative testing was not indicated, since the students in the experimental group were at least as successful as those in the control groups. Comparable test scores in this instance would have been satisfactory. The fact that the experimental group did better on the test than the control was not regarded as conclusive. The conclusive evidence for continuation of the

student-centered technique is the attitudes with which the students approached the class work and the supportive data gathered through research. That is, that the whole student must be educated in order for education to be worthwhile in the first place.

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APPENDIX A

PRE-TEST

FIND THE NUMBERED FALLACIES

September, 30

Dear Mom and Dad,

Classes start tomorrow and I'm so excited I can't believe it! Registration was a madhouse today. I got all the courses I wanted but Astonomy. I was going to sign up for it, but then I heard 80% of all freshmen who take Astronomy flunk it, and I certainly wouldn't want that to happen to me(1).

In a few minutes my roommate and I are going out for a beer. I know I promised I wouldn't drink till I am 21, but in this state it's legal to drink at 18, so it must be ok (2). It wouldn't be legal if the state didn't think it was all right (3). Don't worry though, I'll never start smoking, smoking is bad for you.

I'm so excited about sending me to state instead of the City college. There are lots of advantages. Besides, State has a wonderful reputation, three of the astronauts graduated from here.(4).

October, 10

Dear Folks,

College is a lot harder that high school, but it's a lot more fun and having fun is one of the main reasons for going to college, right?(5) & (6). Marge is joining a sorority. I think they're terrible. For one thing, all the fast kids smoke and drink and have wild parties and so do the sorority girls, so you know they've got to be bad (7).

My courses are hard, but I've met this guy and we study together every night in this small, quiet bar. Bars are much better for me to study in than the library, because you should be comfortable when you study, and I'm very comfortable in bars (8). This bar is called the Teacup and has a very high intellectual level (9). Two of the people I sit with are making all A's. (10). The Teacup has a trained parakeet that is very amusing. The bartender was bringing us a pitcher last night when he started flying around the room.(11).

adopted from Robert J. Kreyche, Workbook for Logic

APPENDIX B

AMERICAN DREAM?

PLACE: Lake Michigan near Wilmette

TIME: The present

PROBLEM: The Du Sables, a Negro family who have moved into a home on the lot marked with their name, have been accused of getting their land by underhanded means, of spoiling the neighborhood, of refusing former rightful owners (campers) access to the property, of having their lot illegally surveyed, and finally of taking some of the property of the Franks, Jones', and even the Scott's. All of the families accuse the Du Sables of these infractions. The Du Sables deny all charges and intend to remain on the property.

BACKGROUND OF THE CASE:

The lot owned by the Du Sables and Jones' had formerly been one lot, (1 & 2 & 3) an open area where people in the neighborhood picknicked, camped out, moored their sail boats, held Easter sunrise services, and played. Some families felt it was part of their property, but actually, a large bank was holding it in trust and was looking after it.

Mr. Du Sable, a Black history professor a N.U., inquired about purchasing lots 2 & 3 because, in the early years of Chicago, his family had lived there, but had been forced out by Indians. All along, they held a deed to what was considered lot 1 which was granted to them by the governor of the state when the first Du Sables settled in Illinois. (Actually, they claimed right to all three lots which had been subsequently divided by the bank now holding the trust.)

Reluctant to have the Du Sables build there, (the lot #1 being too small to build on because of zoning restrictions) but wanting to keep faith with them, the bank divided the rest of the property into two lots and agreed to sell the Du Sables a small section of the lakefront (portion of lot #2) lot, but refused to give up its authority over the entire area. Later, the bank sold the western lot to the Jones family. The bank felt that this arrangement would protect the lakeside property from campers, neighborhood kids, and Negroes who came there to fish.

The National Association for the Advancement of Colored People heard about the sale to the Jones and helped the Du Sables appeal for more of the lakeside lot. Perhaps it was embarrasment of good faith, but more land was sold to Du Sable (the rest of lot #2). Without the bank realizing it, the Du Sables now had just enough land to meet the zoning requirements for building a home.

There was so much trouble with people about the lot with the neighbors that the case was finally taken to court. The court ruled that the Du Sables should keep the second parcel they had bought, but divided the remaining section (3) between the Scotts and the Jones' families. The bank further decided to give up its trust and to let the neighbors settle the problem themselves.

When the neighbors realized that the court had granted some of the land to the Du Sables, they immediately had a meeting and decided to really "fix" these intruders. As one group they crossed into the yard (along with them were campers

and those who had used the lot and regarded it as theirs) but the Du Sables were determined to build and with all their strength pushed the neighbors off and set new stakes now extending their claim to all of the lakeside lot. They set up electrically wired fences, alarms and traps to keep the enraged neighbors away.

Some of the neighbors and campers claimed that they had left valuable equipment on the lot, that they had been there for years and that this constituted possession despite the court order.

There was constant harassment from the neighbors and retaliation from the Du Sables. New hedges that the black family planted were cut down - the Du Sables set up wild dogs in the alley who bit the neighbors' kids. The former campers waited for their equipment to be returned and all of them remained in the alley between the Scotts and the Du Sables. The campers claimed that their altar which was permanently installed on the site could not be removed or be replaced. They had built boat moorings and installed barbeque pits over the period of several years which could not be replaced. The Scotts refused to allow the campers to settle on their property and kept the campers in constant turmoil by reminding them of the equipment they had been forced to leave behind. The Scotts figured that the campers would serve to harass the Du Sables even more. An offer of payment to campers by the Du Sables for their property was ignored.

The situation today is crucial. The bridges over the canal on Scotts property lead to the only railroad into Chicago, and the Scotts refuse to allow the Du Sables to use it. The Du Sables supported by the NAACP, get to work by boats. The bitterness of the neighbors and the campers is intensified by the fact the Du Sables have little guest houses on the property for their many friends. One evening, the irate neighbors and campers threw rocks and stones into the windows of the Du Sables home and guest houses because feelings were running so high. This is the point where the Du Sables placed the guard dogs and wiring around the entire piece of property.

The bitterness is intensified by the fact that the Du Sables have cleaned up the area, have made it very beautiful and have been adding more and more improvements to the property. The neighbors' own yards are in poor condition and their homes are in need of paint, repair and attention. They have spent much of their time and money on ways to get rid of the Du Sables. Every time they look at their former fun place and think of their religious meetings there, they get furious, and are more inflamed when they think how the Du Sables got control of the property.

Mr. Jones is having trouble now with the campers. The neighbors are so eager to get the Du Sables out that they are exhausting him with their plans to call attention to their plight. He's afraid for his own life.

The Scotts have recently found that they are related to a strong Illinois politician and have enlisted his help. This politician is planning a way to get at the Du Sables by accusing the NAACP of illegal interference. He's even making it tough for any other blacks to visit the Du Sables, and he's getting money for the Scotts as well. He claims that the Scotts were the first in the neighborhood and agrees with them that those stakes should be moved back to the original boundary line.

The area right now is in the public eye because Chicago is planning to build a new airport on the lake near this neighborhood. Du Sables land is going to be a very valuable property. The politician knows this too, and more and more he's anxious to get them out, perhaps even buy it himself. But at any rate, he's going to maintain his influence there.

The neighbors were never really very close, but their hatred of the Du Sables had brought them together, at least on the surface. They all refuse to talk with the Du Sables and say - "Let the courts handle this." Perhaps they hope that the politician can bring influence on the courts. They want one thing - out with the Du Sables and a return of the lot to themselves, the rightful owners.

Let us ask some questions. Let us try to settle this suburban problem before real trouble breaks out - near enough to our own homes for us to worry about.

DESCRIPTION OF THE FAMILIES:

Burkes: Being the farthest away, they aren't too interested. They have their own problems.

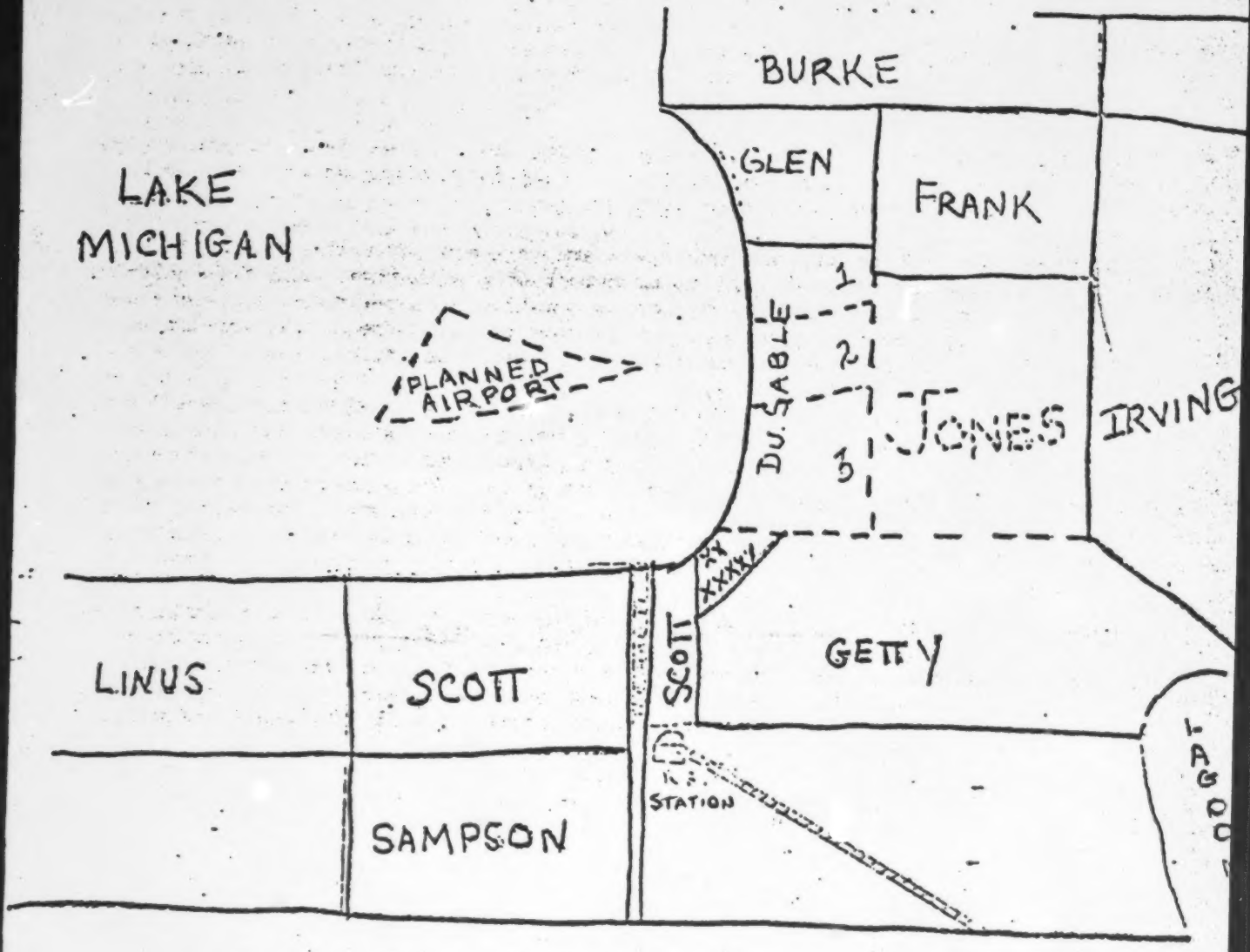
Glens: Rather comfortable, have two children. The mother and children go to the first establishment Church. The father is a Christian, however, and owns a small bank.

Franks: They are not wealthy and fight among themselves. They are prejudiced against Mr. Glen and Mr. Jones. They don't visit neighbors socially and don't keep their property in good repair.

Gettys: They are an aunt and uncle who are very wealthy with no kids of their own, but who have many youngsters living with them. All the children are related to them but some how the kids seem neglected. Their property is one on the lagoon with a large lovely home on it. Some of the yard is well tended, some neglected. But the house is beautiful.

Du Sables. They attend the Baptist Church. They have eight children - all boys, noisy, but hard workers. The mother is never dressed and always working. The kids have bad manners and are rather rude. They do well in school though, and are always seen in overalls. The father tries to be good to the professor but spends most of his time worrying about the neighbors and meeting with friends and relatives and the NAACP members. He's proud to think that his was the first Negro family in the Chicago area.

Scotts: The name Scott has been known in the area as long as the Du Sable name. They are poor now, but have a great deal of pride. Mr. Scott died recently, ten children and a politician who is a relative are carrying on. Their property is being repaired here and there. They were always considered leaders in the community while Mr. Scott was alive.


BURKE
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SCOTT
GETTY
LINUS
SCOTT
SAMPSON
STATION
LAGO

AREA MAP

OAKTON COMMUNITY COLLEGE

MEMO

To Philosophy Faculty

From Phyllis Woloshin

Subject Nova Project

Date Feb. 2, 1977

Copies to E. Lockwood
M. Budarz
Siegfried

I am conducting a project for research on learning theory. I would appreciate if you would send me a copy of the major test you give your logic students in order to see if my approach to teaching informal fallacies is valid. I would like to administer your tests to my classes in order to have the control I need to validate the findings. In return, I would like to have your students take my major test in informal fallacies for more data for my paper.

I would appreciate any feedback you could give me concerning the results of your own testing. The research is being done only to discover if game-theory is a valid approach to content learning. It will be no reflection on the "quality" of teaching by any of us.

Very truly yours,

APPENDIX D

Please fill out honestly!

Amount of contribution to trial (Letter grade) _____

Amount of learning from trial (Letter grade) _____

Level of participation in group (Letter grade) _____

Additional Comments:

APPENDIX E

Test

1. A leader of the opposition to Disraeli sent him a copy of his speech, Disraeli wrote back, "I shall lose no time reading it."

2. The Crusades were a noble endeavor, since men of high purpose founded them and whole countries supported them.

3. Thomas Huxley was defending the theory of evolution. Bishop Wilberforce asked him, "Is it through your grandmother or grandfather that you claim descent from a monkey?"

4. Will you brush your teeth and go to bed?

5. A: Educated people don't believe in ghosts.
   B: Some college people do.
   A: They're not educated just because they went to college, if they were they wouldn't believe in ghosts.

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LOS ANGELES
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6. A: God does not exist.
   B: What evidence do you have to say that?
   A: Can you prove he <u>does</u> exist?

7. A: I'm in favor of compulsory military training.
   B: I'm against it. I'm opposed to anything that violates the Constitution.

8. Child: Why?
   Parent: Because.

9. Two men went into a bank. One man wanted to cash a check. The Banker asked him for identification and the man said, "My friend wil identify me." But I don't know your friend either," said the banker. "Oh, it's all right, I'll introduce you to him."

10. A salesman is having a hard time with a customer who can't make up his mind. "Shall I wrap it up or would you like it delivered?"

11. The consitution guarantees freedom of speech, so it would be unconstitutional to outlaw filibuster in the senate.

12. Prof. Allen: There's no official rule about class attendance, but I will always call role. I want to know how many times you've been absent when I give you final grades.

13. Harvard produces the best PH.D.'s in the country, so any Harvard graduate is better than one from a different university.

14. "Youre the worst teacher I have ever had in college."
    "You're far from the best student I've every had."

15. In some countries where atheism spread the suicide rate has also gone up. Therefore, loss of belief in Gd is a cause of the increased rate in suicides.